

INDUSTRIAL FASTENERS INSTITUTE
6363 Oak Tree Boulevard • Independence, Ohio 44131 USA

1.0 Scope.

1.1 This standard establishes a conformance test procedure for the performance of metric adhesive coated prevailing-torque screws in nominal thread diameters M3 thru M20 inclusive.

Torque values given in this standard are conformance requirements for adhesive coated prevailing-torque screws and apply only to the combination of test conditions described in the performance test procedure (Para. 5.1). If the conditions of the actual service application differ from those of Para. 5.1 (e.g., length of thread engagement, class of internal thread tolerance, different coating on screw or mating part) the torque values may differ. Such values can only be determined through testing the prevailing-torque screw in its actual assembly.

This standard is not concerned with dimensional features such as head styles, or with other mechanical or performance capabilities such as strength properties, corrosion resistance, sealing, suitability for use in high or low temperatures, and/or consistency of torque-to-tension relationships during assembly. Such features and properties are covered in other standards and specifications, and must be referenced when specifying an adhesive coated prevailing-torque screw to ensure that all of the service conditions of the particular engineering application are properly met.

1.2 Definitions.

1.2.1 An adhesive coated prevailing-torque screw (hereinafter called "screw") is an externally threaded fastener which is resistant to rotation due to a adhesive coating, and not because of compressive load developed against the underhead bearing surface of the screw or a tensile load developed in the shank of the screw.

2.0 Referenced Standards.

2.1 ASME Standards.

These may be obtained from ASME; Three Park Avenue; New York, NY 10016-5990.

- ASME B1.3M, *Screw Thread Gaging Systems for Dimensional Acceptability—Inch and Metric Screw Threads (UN, UNR, UNJ, M, and MJ).*

- ASME B1.13M, *Metric Screw Threads — M Profile*

- ASME B18.2.4.1M, *Metric Hex Nuts, Style 1*

- ASME B18.18.2M, *Inspection and Quality Assurance for High-Volume Machine Assembly Fasteners*

2.2 ASTM Standards.

ASTM standards are available from The American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

- ASTM A563, *Standard Specification for Carbon and Alloy Steel Nuts*

2.3 ISO Standards.

ISO standards may be obtained from the International Organization for Standardization, Case postale 56, CH-1211 Geneva 20, Switzerland

- ISO 4032 *Hexagon Nuts, Style 1—Product Grades A and B*

3.0 Designations.

3.1 Types. There are two types of adhesive coated screws based on when the adhesive coating is applied. Preapplied adhesive coatings are applied as part of screw manufacturing prior to delivery for assembly. Applied liquid adhesive coatings are applied as part of the assembly operation or in service applications.

3.2 Design. The composition and application of the adhesive coating shall be in accordance with the practice of the manufacturer. For applications where temperatures may exceed 93°C and/or a lubricant is present or applied for protection or ease of assembly, an adverse effect may result on the prevailing-torque material. The manufacturer's data should be consulted to determine suitability of the selection.

IFI STANDARD® <i>Published and issued by the Industrial Fasteners Institute of Independence, OH</i>	TEST PROCEDURE FOR THE PERFORMANCE OF METRIC ADHESIVE COATED PREVAILING-TORQUE SCREWS	IFI-525 Page 1 of 3 Issued: 1982 Revised: Aug. 1, 2007
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4.0 Requirements.

4.1 Finish. Screws shall be furnished plain or with a protective coating as specified by the purchaser.

4.2 Threads.

4.2.1 Thread Tolerances. Threads of prevailing-torque screws shall be tolerance class 6g as specified in ASME B1.13M.

4.2.2 Thread Start. Screws shall assemble a minimum of one full turn by hand into any mating internally threaded component before engaging the coating that has threads acceptable to Gaging System 21 of ASME B1.3M.

4.3 Performance.

4.3.1 The prevailing-torque of screws occurring during the first installation shall not exceed the maximum prevailing-on torque specified in Table 1 or Table 2, as applicable, when tested as specified in Para. 5.1. In addition, the breakaway torque and highest prevailing-off torque occurring during the first removal shall not be less than minimum torques specified in Table 1 and Table 2, as applicable, when tested in accordance with Para. 5.1.

4.3.2 Prevailing-Torque. Screws which are too short or which have thread lengths too short to permit testing in accordance with Para. 5.1, shall have their torque requirements and test procedure established by agreement between the purchaser and manufacturer.

5.0 Performance Test.

5.1 Test Procedure. The sample screw shall be assembled into the countersunk side of a test nut (Para. 5.1.1). During the performance of the test, the nut shall be turned using manual torque only, while the test screw shall be restrained from turning. The nut shall be advanced until the coated threads of the

screw are fully engaged. The highest torque occurring while the test nut is in motion shall be measured and recorded. Speed of rotation shall be approximately 12 RPM. Speed of rotation shall not exceed 30 RPM.

After 24 hours at 24°C (±3°) in the assembled condition the breakaway torque of the test nut shall be measured. Breakaway torque is defined as the torque to start rotation in the loosening direction. Removal shall be continued and the prevailing-off torque measured and recorded. Prevailing-off torque is defined as the highest removal torque occurring during the next 360° of rotation following breakaway in the loosening direction.

5.1.1 Test Nut. Test nuts shall conform to the requirements of ASME B18.2.4.1M, Style 1 or ISO 4032, Style 1 having a plain or dry phosphate (oil free) finish. A new test nut shall be used for testing each screw. Prior to use, the threads of each of the test nut (Class 6H thread) shall be inspected for acceptability following the requirements of Gaging System 21 of ASME B1.3M.

Refer to ASME B18.18.2M for sampling plan (Table 3, destructive, Level A).

6.0 Inspection.

6.1 Inspection Procedure. Screws shall be inspected to determine conformance with the requirements of this standard.

Unless otherwise specified, from each lot of screws the following number of tests shall be conducted to determine the acceptability of each of the requirements:

Lot Size (pieces)	No. of Tests
to 50	2
51 to 500	3
501 to 35,000	5
over 35,000	8

Alternate inspection procedures may be specified by the purchaser on the purchase order or engineering drawing.

IFI STANDARD®	TEST PROCEDURE FOR THE PERFORMANCE OF METRIC ADHESIVE COATED PREVAILING-TORQUE SCREWS	IFI-525 Page 3 of 3
Published and issued by the Industrial Fasteners Institute of Independence, OH		Issued: 1982 Revised: Aug. 1, 2007

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Table 1 Torque Values for Screws With Preapplied Adhesive Coatings

Nom Screw Size and Thread Pitch	Prevailing-On Torque N•m	Breakaway Torque N•m	Prevailing-Off Torque N•m
	Max	Min	Min
M3 × 0.5	0.3	0.15	0.07
M3.5 × 0.6	0.5	0.3	0.15
M4 × 0.7	0.7	0.4	0.3
M5 × 0.8	1	0.8	0.5
M6 × 1	1.8	1.5	0.8
M8 × 1.25	2.8	4.0	2.0
M10 × 1.5	5.5	11	4.0
M12 × 1.75	7.2	16	7.0
M14 × 2	11	22	10
M16 × 2	14	33	16
M20 × 2.5	22	45	22

NOTE:

Values are based on nut engagement in chemical area for a distance of one nominal screw diameter.

Table 2 Torque Values for Screws With Applied Liquid Coatings

Nom Screw Size and Thread Pitch	Prevailing-On Torque N•m	Breakaway Torque N•m	Prevailing-Off Torque N•m
	Max	Min	Min
M6 × 1	—	0.56	0.34
M8 × 1.25	—	2.0	1.0
M10 × 1.5	—	3.4	1.1
M12 × 1.75	—	4.8	1.2
M14 × 2	—	6.0	2.0
M16 × 2	—	6.8	2.8
M20 × 2.5	—	13	5.5
See Notes	1		2

NOTES:

1. Prevailing-on torque for screws with liquid coatings applied at the time of assembly is essentially zero.
2. Minimum value for any of the available liquid coatings. Higher removal torques may be obtained through selective choice of liquid coating used.

Tables 1 & 2 note: Values apply to those listed. For the performance using other pitches contact the supplier.

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